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COUNTRY Czechoslovakia

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SUBJECT Tesla Production of Thin Heating Spirals

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THIS IS UNEVALUATED INFORMATION

1. The first heating filaments manufactured in the Tesla-Hloubetin plant were low-voltage filaments (4 volts and 6.3 volts) produced there since 1946. Until that time, all of the materials of this kind were imported, mainly from the Philips plant at Eindhoven, the Netherlands. The production of filaments for a high voltage (between 20 and 80 volts) started in the plant in 1947. These high voltage filaments were replaced by thin spirally wound heating filaments the production of which started in 1948. The thin spiral heating filaments were used for small receiver vacuum tubes. the heating filaments used in the USA for the same purpose were wound zig-zag fashion on a flat base.)

2. The material used for these spirals was tungsten wire of a small diameter. The smallest diameter used was 0.085 mm. for the UCH 21 tubes. The other diameters were slightly larger. The tungsten wire was wound on a molybdenum wire which acted only to form the spiral. The molybdenum wire was of 0.2 mm. diameter or slightly larger. The winding was performed in a continuous process on special Brueckner machines of German origin, which were delivered to the plant some time during World War II.

While being wound from a bobbin on the molybdenum wire, the tungsten wire was electrically heated in order to be malleable and to retain its shape after being wound into a spiral form. After being wound, the spirals were cut to the length needed and shaped into a V form. The spirals were then coated with an insulation material. The insulation process was performed by cathophoresis. this method was patented by the Eindhoven Philips firm. However, it was used in Czechoslovakia. The spiral wound tungsten wire was fixed to a frame and suspended in a solution of Al₂O₃ and ethyl alcohol. Under the influence of direct current, molecules of Al₂O₃ coated the spiral filament. The filaments were removed from the bath and were heated by electric current to sinter the insulation material. The filaments were then put in nitric

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acid which etched out the molybdenum wire so that only the spiral of tungsten remained. The etching solution may have been a mixture of nitric and sulphuric acids. The filaments were then washed in water, then in a weak solution of ammonia, and finally in water again.

3. At the end of 1949, this production of spirally wound heating filaments was transferred from the Tesla-Hloubetin plant to the Tesla plant in Roznov pod Radhostem N 49-28, E 18-087.

Annex:

A. Thin Heating Spirals Production Process

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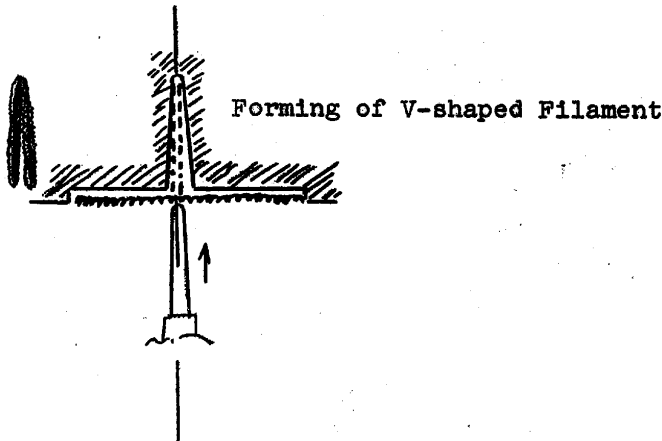
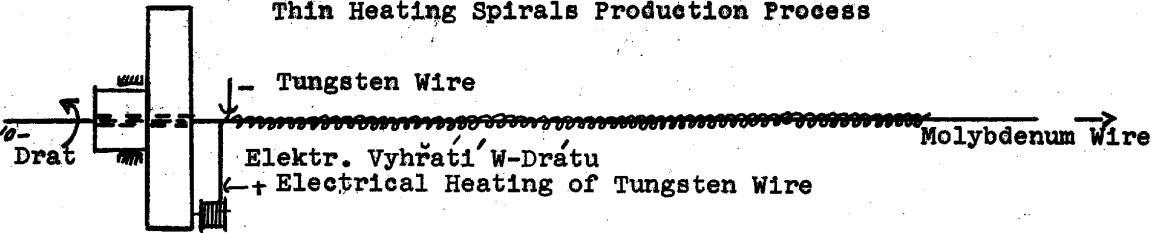
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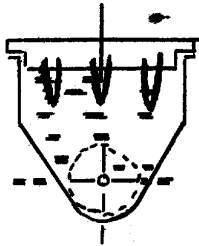
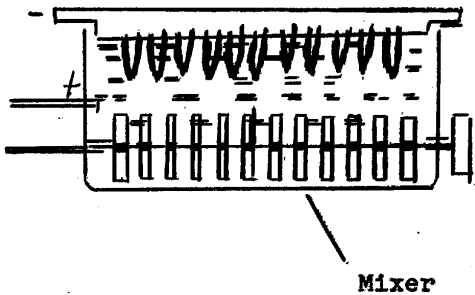


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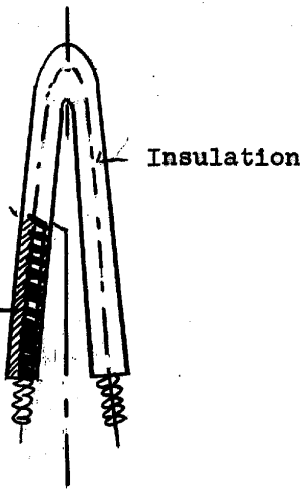
ANNEX A:
Thin Heating Spirals Production Process



Coating Filament with Al_2O_3



Suspension of Al_2O_3



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